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taurea, though he has not approached nearer a final explanation of the phenomenon than others before him. A cross-section of the filament shows a dorsal region of collenchyma-like tissue with almost imperceptible intercellular spaces. The ventral region is occupied with loose parenchyma. The walls of the collenchyma-like tissue are characterized by considerable contractility in longitudinal direction. The papillose epidermis of the ventral side is practically impermeable, but if carefully removed and the exposed tissue submerged in solutions of varying osmotic strength it appears that a curvature of the filament results from the plasmolysis and consequent contraction of the collenchyma-like tissue. The author's explanation agrees with that of PFEFFER, namely, filtration under turgor pressure, and whatever causes the escape of water from the cell permits contraction of the cell walls and results in curvature. The author thinks that the papillose epidermis of the ventral side cooperates with the collenchyma-like tissue in contraction. Why the contact stimulus should cause filtration under pressure is no more accounted for than before. The filaments of *Centaurea* will endure surprising transpiration without loss of contractile capacity.—RAYMOND H. POND.

**The fertile spike of Ophioglossaceae.**—CAMPBELL<sup>23</sup> has studied the morphology of the sporophyll and the distribution of the vascular bundles in the three genera of Ophioglossaceae, abundant material having been obtained during his recent visit to the oriental tropics. A study of the development of the sporophyll suggested that the "fertile spike" is the terminal structure rather than an adaxial branch. This view was confirmed by the distribution of the vascular bundles of the leaf, those supplying the spike evidently not being given off from the main bundles of the petiole as branches, but being a continuation of the main bundles. From this point of view, the fertile spike terminates the main axis, which bears the foliage blade as a lateral member. This accords with the author's previously expressed view that *Ophioglossum* is perhaps the most primitive of the pteridophytes, the "fertile spike" being most naturally connected with such a structure as the sporogonium of *Anthoceros*. "This hypothesis assumes that, by the development of a root from the lower part of the sporophyte and a complete septation of the sporogenous tissue of the sporogonium, so that something resembling the spike of an *Ophioglossum* resulted, there would be formed a plant not very unlike *O. simplex*."—J. M. C.

**A cotton fungus.**—According to a preliminary paper by BALL,<sup>24</sup> the "sore-shin fungus" which occurs on cotton and other plants in the United States is also very common on cotton seedlings in all parts of Egypt. The fungus is said to be responsible for most of the resowing which is necessary in Egyptian cotton fields. The damage, which is not great, is caused partly by rotting of the seed-

<sup>23</sup> CAMPBELL, D. H., Studies on the Ophioglossaceae. Amer. Nat. 41:139-159. figs. 17. 1907.

<sup>24</sup> BALL, W. L., The physiology of a simple parasite. Reprint, Jahrb. Khedivial Soc. pp. 25. pls. 6-7. 1906.

ling in the soil and partly by damping off. A large proportion of the plants which are attacked after breaking through the ground recover by subsequent healing of the injured shins. After showing that the fungus is dependent upon oxygen for growth, the writer states his belief that the fungus attacks the plants at the surface of the ground because here only there exists a zone with sufficient oxygen and yet not too dry for the growth.

It may be mentioned that the sore-shin fungus of the United States is believed by DUGGAR and STEWART<sup>25</sup> to be *Rhizoctonia*. BALL, however, failed to find the typical sclerotia of this genus in the Egyptian form, so that it is possible that the two forms are not identical, unless the sclerotia have been overlooked.—H. HASSELBRING.

**Electroculture.**—GASSNER, before he was called to the University of Montevideo, had begun some investigations on the effect of electric currents, constant and alternating, which, though incomplete, had some interesting results.<sup>26</sup> The constant current in general proved injurious (*cf.* his results and PLOWMAN's on galvanotropism noted in this journal). The alternating current, when the alternations were rapid enough, was not injurious because it did not act at all; it was not found advantageous, as LÖWENHERZ reports.<sup>27</sup> It does kill grubs and worms in the soil when not hurtful to plants and may thus be useful practically. With induced currents from a frictional machine, potted barley grew better when electrified for 13–14 hours daily from needle-points above the plants, which accords with the earlier results of LEMSTRÖM (1890) and CHODAT (1892). One notable fact was the threefold evaporation from the electrified plants, as compared with the controls. Even greater differences, 6:1, appeared when porcelain dishes filled with water were substituted for the pots.—C. R. B.

**Palisade cells.**—RAUNKIAER decides in favor of STAHL's view, that palisade cells owe their form to light, as against ARESCHOUG's that transpiration is the determining cause, from his studies upon the palisade of *Scirpus lacustris*.<sup>28</sup> The leaves of plants growing somewhat apart from the clump show equally well-developed palisade cells in the leaf above water and to a depth of 20<sup>cm</sup>. From this point to a depth of 50<sup>cm</sup> the length of the palisade cells gradually diminishes. In similar plants growing crowded and therefore shaded, no palisade cells are distinguishable in the submerged parts, nor in the aerial region up to a height of 30–40<sup>cm</sup>, where they commence to appear. In this case there is clear evidence that the external factor, light, calls forth this differentiation. In other

<sup>25</sup> The sterile fungus *Rhizoctonia*. Cornell Univ. Agr. Exp. Sta. and N. Y. Agr. Exp. Sta. Bull. 186. 1901.

<sup>26</sup> GASSNER, G., Zur Frage der Elektrokultur. Ber. Deutsch. Bot. Gesells. 25:26–38. 1907.

<sup>27</sup> LÖWENHERZ, Versuche über Elektrokultur. Zeit. Pfl.-krankh. 15:137 ff. 1905.

<sup>28</sup> RAUNKIÆR, C., Nogle Iagttagelser og Forsøg over Aarsagerne til Palissadecellernes Form og Stilling. (Sur les causes qui déterminent la forme et l'orientation des cellules palissades.) Bot. Tidsskrift 27:293–311. 1906.